

PCT**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**
(PCT Article 36 and Rule 70)

REC'D 07 SEP 2004

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Applicant's or agent's file reference P 01 113 WO	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)
International application No. PCT/DK 03/00171	International filing date (day/month/year) 14.03.2003	Priority date (day/month/year) 15.03.2002
International Patent Classification (IPC) or both national classification and IPC G02B6/12		

Applicant
TECHNICAL UNIVERSITY OF DENMARK

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:
- I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 18.09.2003	Date of completion of this report 05.07.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Faderl, I Telephone No. +31 70 340-3455 

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I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17):*

Description, Pages

1-24 as originally filed

Claims, Numbers

1-41 as originally filed

Drawings, Sheets

1/13-13/13 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-41
Inventive step (IS)	Yes: Claims	
	No: Claims	1-41
Industrial applicability (IA)	Yes: Claims	1-41
	No: Claims	

2. Citations and explanations

see separate sheet

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Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

D1: PATENT ABSTRACTS OF JAPAN vol. 2000, no. 19, 5 June 2001 (2001-06-05) & JP 2001 051244 A (COMMUNICATION RESEARCH LABORATORY MPT), 23 February 2001 (2001-02-23)

D2: WO 00 37974 A (CORNINIG INC) 29 June 2000 (2000-06-29)

D3: US-A-6 134 043 (JOANNOPOULOS JOHN D ET AL) 17 October 2000

D4: MEADE R D ET AL: 'NOVEL APPLICATIONS OF PHOTONIC BAND GAP MATERIALS: LOW-LOSS BENDS AND HIGH Q CAVITIES' JOURNAL OF APPLIED PHYSICS, AMERICAN INSTITUTE OF PHYSICS. NEW YORK, US, vol. 75, no. 9, 1 May 1994 (1994-05-01), pages 4753-4755, XP000543576 ISSN: 0021-8979

D5: CREGAN R F ET AL: 'SINGLE-MODE PHOTONIC BAND GAP GUIDANCE OF LIGHT IN AIR' SCIENCE, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, US, vol. 285, no. 5433, 1999, pages 1537-1539, XP000914812 ISSN: 0036-8075

2.1 The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses (the references in parentheses applying to this document):

2.2 A planar optical waveguide (105) comprising a core region and a cladding region (104) comprising a photonic crystal material (104), said photonic crystal material having a lattice of column elements, wherein at least a number of said column elements are elongated substantially in an axial direction for said core region.
Therefore, the subject-matter of claim 1 is not novel (Article 33(2) PCT).

3.1 Document D2 also discloses a similar structure as the invention but shows an optical fiber. The optical fiber being known, the optical waveguide would not be considered as involving an inventive step according to Article 33(3) PCT over the optical fiber.

3.2 Document D3 (see figure 9) discloses a method of making a planar optical waveguide including a photonic crystal between confinement layers.

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3.3 Document D4 shows in figure 1F the guiding principle illustrated in the application, i.e. confinement via total internal reflection (TIR) in the vertical dimension and photonic bandgap confinement in the plane. Other combinations of confinement are also demonstrated.

3.4 Document D5 explains the difference in waveguiding for three different type of waveguides: TIR, Bragg form of PBG guidance, and real PBG guidance

3.5 Therefore, the dependent claims 2-41 do not contain any features which meet the requirements of Art 33(2) and 33(3) PCT with respect to novelty and/or inventive step.